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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**AGENDA FOR INTERVIEW**

APPLICANT: Torsten Niederdrank **GROUP ART UNIT:** 2815
SERIAL NO.: 10/798,180 **EXAMINER:** Fatimat O. Olaniran
FILED: March 11, 2004 **CONFIRMATION NO.:** 5312
TITLE: AUTOMATIC MICROPHONE EQUALIZATION IN A
DIRECTIONAL MICROPHONE SYSTEM WITH AT LEAST
THREE MICROPHONES

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

S I R:

In the telephone interview scheduled for June 30, 2008 at 10:00 a.m. EDT, the undersigned representative of the Applicant proposes to discuss the following issues.

In the April 14, 2008 Office Action, the Knapp et al. reference was relied upon for the first time, in combination with Bradley et al., as the basis for rejecting Independent claim 1 and (further in view of Baumhauer Jr. et al.) independent claim 12.

In order to obtain good directionality for a directional microphone system that is formed by combining several omnidirectional microphones, it is necessary for all of the omnidirectional microphones in the directional microphone system to be matched to each other in terms of amplitude and phase, namely all of the omnidirectional microphones should have the same (equalized or matched) amplitude and phase characteristics.

Amplitude matching is relatively easy to accomplish, but phase matching, done in the conventional manner disclosed in the references of record, is

complicated because it is conventionally necessary to measure phase shifts, which is considerably more difficult than making an amplitude measurement.

In the method and apparatus of claims 1 and 13, the procedure for matching the phase and amplitude characteristics of omnidirectional microphones that are being combined to form a direction microphone system is simplified, by undertaking the necessary phase and amplitude matching in two separate steps.

Applicant acknowledges that the Bradley et al. reference discloses a hearing aid having a directional microphone system. As the Examiner has acknowledged, the Bradley et al. reference does not disclose automatically equalizing or matching microphone signals in the manner set forth in claims 1 and 13. The Examiner relied on the Knapp et al. reference as, according to the Examiner, disclosing a method for automatically equalizing microphone signals that includes the steps of equalizing respective amplitudes of respective microphone signals (for which the Examiner cited column 1, lines 51-65) and equalizing the respective amplitudes by phase shifting the microphone signal generated by at least one of the microphones, the Examiner citing Figure 2 and column 4, lines 11-15 for this purpose.

Applicant submits that the Knapp et al. reference is not at all concerned with the problem of microphone matching or equalization. The Knapp et al. reference discloses a particular way to construct a directional microphone by combining a number of omnidirectional microphones. For this purpose, the Knapp et al. reference assumes that the omnidirectional microphones that are employed for this purpose are already well-matched to each other, meaning that all of these omnidirectional microphones have substantially the same transfer function. If this

were not the case, the functionality which is the intended result of the Knapp et al. reference could not be achieved.

As the Examiner has noted, the Knapp et al. reference does discuss introducing a delay in a microphone signal, however, in the Knapp et al. reference this is not for the purpose of matching respective microphones or the respective microphone signals therefrom, in order to compensate for a transfer time difference, but is instead for the purpose of producing the desired directionality. In doing so, the microphone signals in Knapp et al., which originate from acoustic signals that are detected by the microphones at the same time, are emitted from the respective microphones out of phase, due to the intentionally introduced delay. This phase delay or phase shift is essential to achieving the directionality that is intended in the Knapp et al. system.

Therefore, the Knapp et al. reference provides teachings that are opposite to the subject matter disclosed and claimed in the present application. In the Knapp et al. reference, the microphones, if the steps disclosed in the Knapp et al. reference were not undertaken, would emit equal (matched) microphone signals, but this is not wanted in the Knapp et al. system since equal (matched) microphone signals would not produce the desired delay. In the Knapp et al. reference, therefore, a relative delay is intentionally introduced into one of these signals, which is the opposite of the matching or equalization that takes place in claims 1 and 13 of the present application.

Differences in the amplitude are not discussed at all in the Knapp et al.
reference.

Submitted by,

Steven H. Noll (Reg. 28,982)

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